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ABSTRACT

This paper provides a framework for a plan for the utilization of technology in a school district. An example of a set of proficiencies for the use of computers by students at various grade levels is offered as a model for the computer literacy component of a district master plan. Other components discussed are the supervision and management of technology and staffing, training, and support for instructional, administrative, and support staff. It is argued that the school library media center is the natural place for implementing technology in the school and the objectives of the school library media program, as stated in the American Library Association's guidelines, "Information Power," are listed in support of this position. Various technologies appropriate for use in the school library media center are also described: computerized inventory and circulation; electronic card catalogs; external databases; encyclopedias on compact disk; laser disk collections; camcorders and videocassette reorders; library networking; facsimile machines; large screen projection units; and minicomputer laboratories. The paper concludes by presenting three strategies important to a commitment to technology in education: (1) bring more technology into the schools; (2) place personnel responsible for managing technology in positions within the organization where they can be effective; and (3) develop media centers to provide a foundation and continuity in mastering the processing of information. (23 references) (MES)

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TUNE UP

Technology Utilization Needs Enhancement
Understanding Progress

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TUNE-UP

(Technology Utilization Needs Enhancement - Understanding Progress)

Robert J. Rodgers

Schools are at a critical stage of development in the utilization of technology. Although more comprehensive long range planning is needed, technological advances are occurring faster than long range plans can be implemented. The emphasis needs to shift from getting started to the nitty gritty of utilizing technology efficiently and effectively for the improvement of instruction.

As in tuning up an automobile, there are certain subsystems that need to be checked and adjusted or replaced. Although not all existing components need to be discarded, not all should be expected to last forever. In tuning up the utilization of computers and other technologies in education, the following components need to be scrutinized: program completeness, utilization management, training and staffing, and dynamic awareness.

While education has experienced many fads, some "technological" developments have prevailed. Ball point pens, erasable pens, and white-out are more common than pens and bottles of ink. The computer has had a greater impact on education than previous technologies since it has become part of the curriculum, a teaching strategy, and a tool that improves the handling of information

Computers have now become such an integral part of society that few critics question their existence in the schools. While the expense of such equipment still needs justification, the need for computers and other technolologies is readily accepted. It's time to accept technology as an integral part of education and to examine how, where, why, and by whom it is and can be used. A district utilization plan needs to be in place, with the capability to mature with the evolution of technology.

An example of a set of proficiencies for the utilization of computers that could serve to guide the utilization of technology in a school district is provided as a model - to be customized according to local needs and resources:

GRADES K-4 Basic keyboarding instruction and use of computers in various areas of the curriculum. The emphasis at this level should be: familiarity with the keyboard, versatility, usefulness, and operation. Keyboarding skills should be developed. Computers should also be used, at least, in mathematics and language for drill and practice needed to master basic skills. This methodology provides a more enjoyable and motivational format for the students, immediate feedback, and the possibility ofindividualized programs that better meet student needs.

GRADES 5-6 Simple word processing instruction and frequent usage. The emphasis needs to be on the creation of text, editing, saving and retreiving files, and producing a hard copy. "Practice" can be done while developing language skills. Writing skills will be improved with the ability to revise work easily. A key factor is frequent structured usage as well as the provision for open access.

GRADES 7-9 Additional word processing instruction; computer literacy instruction; and introduction to use of data bases, spreadsheets, and graphics. The necessary elements for success are: availability of open access, substantial use of word processing, student understanding of the dichotomy of the computer's need for precision and its provision for allowing self-expression, a creative and encouraging staff, and support.

GRADES 10-12 Required courses in programming concepts and use of application software, and various electives that utilize the computer. Again, an important ingredient is readily available open access. The incorporation of technology into various areas of the curriculum should be as extensive as resources permit.

Such a district master plan needs to be philosophical, specific to curriculum and instruction, flexible, and alterable. Important to the success of the plan is the mixture of instruction, structured usage, and open access. This combination addresses individual needs and aspirations; while ensuring a "survival" level of proficiency and equality of access and opportunity for all students. The "computer literacy" component needs to: provide instruction of the fundamental operation of computers; promote understanding of the potentials and limitations; and address social and ethical issues such as security, pirating, viruses, and changes in the work environment. The overriding philosophy should stress the use of technologies as efficient and effective "tools".

The school media center is an existing establishment in most schools that provides open access, across the curriculum and for all students.

Another component of a comprehensive program for the utilization of technology is supervision and management. This requires personnel, expertise, and commitment. If we expect technology to serve as an impetus to improve curriculum and instruction, we can not simply let the pieces fall where they may without guidance and direction. This is a fine line - because too much "control" and standardization will stifle future developments and involvement. However, personnel must be in place to guide change and new developments into the most effective and efficient into the curriculum.

There is a limit as to how much "new" material can be added to an already saturated curriculum. Decisions, perhaps involving political battles and other protectionist struggles, will need to be made that may involve substantial "housecleaning" of "old" skills that the technology replaces with "new" skills.

Technology management needs to stay abreast of the progress being made in technology. While limited budgets and salaries will restrict expertise available to most levels of education, it is essential to have in-house technology leadership that can understand technology and has the ability to interface with consultants and salespeople.

Other areas of technology management that need attention are inventory, repairs, and supplies. Computers and other technologies represent a substantial amount of a school district's expenditures, and an accurate inventory and accountability are essential. There is a range of possibilities for repairs, from student technicians and repair programs to quite expensive contracted services. The management of supplies can have significant ramifications on operating budgets and future expansion.

For example, diskettes can range in price from $.25 each to $3.00 each. Purchasing in quantity and distributing within district can result in savings. If a district uses diskettes, printer ribbons, and paper in substantial quantities; future evolution of the program can be augmented with the savings that can result by good management of expenditures for supplies.

Software developers are now recognizing the needs of education and offer a variety of site license and network agreements that can significantly reduce software costs. As reported by Salpeter (1988) and Solomon(1988), there is a multitude of options. Contractual requirements make additional demands for supervision and management. Poor management can result in liabilities, loss of savings, and a host of other problems.

Another component of a comprehensive program for the utilization of technology that needs close scrutiny is the area of staffing, training, and support. When computers first started entering the schools, most came through the mathematics and science programs. They then became visible in the business and industrial arts departments. They have now proliferated into most areas in the curriculum. (This follows the development of computers: first for the mathematicians and scientists, then for business, then for the general populace -- first there was FORTRAN, then COBOL, then BASIC, and now hundreds of languages.)

This proliferation of computers and other technologies in education puts an emcumbrance on staffing and training. Staffing needs change. Williams (1987) states "job tasks must be reviewed, studied, analyzed, redesigned and, in some cases, eliminated." Although technology can reduce staff needed to do mundane tasks, it has created new positions to handle the technology and to support other staff members. "General" training now is needed by most educators and the specialized nature of applications that serve the specific needs of the various areas within the curriculum require "specific" training and/or support. "Computer specialists" may not understand the intricacies of specialized software, yet their experiences in supporting a variety of users can expand their expertise and increase their level of support. Add to that the needs of non-instructional staff; such as secretaries, maintenance, and food services personnel; and there is a growing need for a support group within an organization. Consultants are too expensive to use every time there is a need for support. Braun (1988) reports that, in light of recent scandals in vocational funding within the state, the use of consultants will no longer be permitted as "professional services" under new New Jersey regulations. Such services will now need to be run through the bueracratic red tape of specifying exact services and bidding that will make this route useless for minor, quick assistance.

Solomon (1988) states that software publishers incorporate into their pricing schemes for site licensing and volume discounts the assumption that an organization will provide some degree of internal support, so that they will not need to supply as much support to individual users. Few salespeople provide follow-up support since it's not profitable. With time, the increased number of users creates an informal support group. But, for now, formal support service must be part of a comprehensive program for the use of technology.

The school media center is an existing establishment that provides support to a school, across the curriculum and for all students and staff. This role has been augmented by technology.

Professional standards provide the philosophical framework for evolutionary change. The American Library Association first published such standards in 1920. The terms "library" and "librarian" were replaced by "media center" and "media specialist" in the 1960s. At that time the standards began to include AV materials. The A.L.A.'s 1988 publication : Information Power addresses the effect of expanded access to new sources of information. It offers visions and guidance in dealing with the increasingly vast amount and types of information available to the school library media program and the increased use of the media center in the instructional process.

Information Power states that the current mission of the school library media program encompasses the following objectives:

1. to provide intelllectual access to information
2. to provide physical access to information
3. to provide learning experiences that encourage users to become discriminating consumers and skilled creators of information
4. to provide leadership, instruction, and consulting assistance in the use of instructional and information technology
5. to provide resources and activities that contibute to lifelong learning
6. to provide a facility that functions as the information center of the school
7. to provide resources and learning activities that serve the needs of a diverse population

No longer is the media specialist primarily a "keeper of the books." Technology not only has allowed for changes in the operation and structure of the media center, but has precipitated many of these changes.

In the development of a comprehensive program for the utilization of technology, the media center becomes an integral component. It is an existing structure that provides an open access environment and support services to both students and staff. The "mission" delineated by the A.L.A. is not only consistent with the needs for the utilization of technology, but also signals a commitment to addressing these needs.

Some existing technologies appropriate for use in the school library media center include:

1. Computerized inventory and circulation
2. Electronic card catalogs
3. External data bases
4. Encylopedias on CD
5. Laser disk collections
6. Camcorders and VCRs
7. Library networking
8. Facsimile machines
9. Large screen projection units
10. Minicomputer labs

Circulation and inventory functions can now be computerized with the use of a microcomputer and a hard drive. Many microcomputers have enough speed and memory to process such data sufficiently. Hard drives, now at reasonable prices, can accommodate the vaste amount of data needed for such operations in most school media centers. Bar codes and scanners, while increasing the set up costs and time, can inprove the effeciency of the operation. Library of Congress information can be obtained on CD and downloaded into the local system, avoiding much of the set-up time and costs of data entry. Specific and summary reports can provide the media specialist with valuable information for decision making.

Electronic card catalogs bring about more than just a physical change in the library. The average user will find more information, and improved cross-referencing will provide the more determined user the opportunity for a more thorough research. The number of "terminals" needed is an issue. The traditional card catalogs allow for numerous users simultaneously, while electronic card catalogs speed up the search process and make fewer work stations necessary.

External data bases extend the accessibility of data beyond the walls of the local media center. Dow Jones offers special school pricing plans that make it very affordable to bring news, sports, financial news, book reviews, and an encylcopedia to the library media center. DIALOG, while more expensive, makes more data bases available; including the education-based ERIC. The State of New Jersey, various colleges and universities, and other special interest groups offer a wide range of bulletin boards, data bases, gateways to other networks, conferencing, electronic mail, and other functions. Numerous communication software packages allow for information obtained from such sources to be downloaded directly into word processor files.

Encyclopedias on CD take up less space, allow for selected information to be downloaded into word processor files, and provide for more thorough research. They also solve the problem of updating, since complete versions that incorporate revisions are available every six months.

Laser disk collections become another medium for the source of information. Besides the usual storage, inventory, circulation, new equipment, and usage associated with a new medium; interactive programming also makes this an instructional medium. This interactive programming can provide independent study, remedial instruction, and opportunities for absent students to make-up lost class time. Helgerson (1988) reports that in a survey of 40,000 librarians, 90% indicated that they would have at least one CD-ROM drive by the end of 1988.

With improved quality, more programmable features, and lower price tags; VCRs and camcorders should be increasing in numbers and usage.

Networking libraries' computerized inventory and circulation systems together is following the success obtained from the banking, airline, real estate, and other businesses. This means that libraries can share their resources, giving and taking information. Fax machines, now a common "necessity" in business, will allow for this sharing of information in a timely manner.

With the increased use of computers across the curriculum, large screen projection units are becoming "necessary" items. These units allow a teacher to use 1 computer and make the output visible to an entire group on a large screen or wall. As Olivas (1987) states, "it is a new technology that opens the door to many creative teaching techniques."

With the increased amount, sources, and formats of information accessible in the school library media center; it is becoming a natural place to process this information as well. "Mini-computer labs" are becoming common components to many school library media centers.

The current concern to improve students' critical thinking skills increases the demand for better media center facilities. Critical thinking depends on retreiving, organizing, synthesizing, and evaluating information. The strategies and the logistics in accessing the appropriate sources of information place the media specialist in the position of instructor of information processing.

The other component of a comprehensive program for the utilization of technology is a built-in, on-going dynamic awareness of technological developments that are applicable to the educational process and those that will become necessary in the lives and occupations of our students in the 1990s and the twenty first century. This awareness is needed by leadership, staff, and students. Current and future technology that was not in the picture when most computers entered the schools include: facsimile machines, reliable networks, large screen projection units, voice recognition, and optical disks.

Facsimile machines have now become so popular in business that most students will probably use them in their future. According to Wu (1988), "fax booths" are be installed in large cities and airports. In the future, students may use them as commonly as we presently use public and mobile phones.

When microcomputers started making their way into the schools in substantial numbers, most networks could not handle the relatively specific needs of education. Networks are not designed to have 30 users executing the same procedure at the same time, yet most classes start at a prescribed time and end at a prescribed time. Here again, open access becomes an efficient and necessary option. Today's networks are much more sophisticated and have evolved into a relatively efficient and effective means to share data and equipment.

Voice recognition, comfortably understood by viewers of the TV show "Knight Rider", can be viewed as science fiction or as a technology that is being mastered and will soon have a tremendous impact on the way we process information. Perhaps, before many people master the keyboard, we will be able to talk into the word processor instead of typing. Most of us can remember thinking that going to the moon was science fiction, yet we have witnessed this numerous times in our lifetimes. Awareness of technology is an on-going necessity.

Optical disks are now making large amounts of data available to users of microcomputers. This technology has made encylopedias on disk practical since there's a limit to how much disk-swapping people are willing to tolerate. Now, as writing to optical disk becomes possible, file management goes from disk-handling to management of THE disk.

As early as 1982, Nesbitt (1982) suggested that our country was an information society. He advanced the notion that our educational systems needed to substantially modify the mode of operation that was successful during the Industrial Revolution and the subsequent period of American industrial supremacy. Gannes (1988) notes that the computer industry is the third largest industry in our country (behind automobiles and oil). The percentage of workers using computers in the execution of their duties is rapidly increasing. Dreyfuss (1988) states that, by 1990, one out of every three white-collar workstations will contain a computer.

Modern society demands an on-going education. With the impact of technology in the workplace, careers often include numerous occupational positions requiring diverse training with transferrable skills. As we teach our students how to learn on a continuing basis, the media center becomes a continuing location of utilization. Therefore, as we infuse the computer into the schools and across the curriclum, the media center becomes the natural place to be a modern equipped resource in the school.

Just as providing a tuneup for an automobile is more complicated and needs modern equipment and better trained mechanics; tuning up a school's technology utilization program is also a very complicated matter and needs a larger commitment than ever before. It needs a commitment of resources, time, personnel, money, and planning. There is no one plan or method that will guarantee success. In making and implementing long range plans for the development of the school as the foundation for on-going learning, the media center becomes a viable location for much of the new technology that will be used in our future for the processing of the vast amounts of multi-formatted information that has become a trademark of our present society.

Addressing the evolution of the school library media center also addresses concerns common to most educators: improvement of students' critical thinking skills, the continued need for education, use of technology as the best tools, and revision of the curriculum. **The media center proves to be the most cost-effective place to implement this infusion of technology to have an impact across the curriculum.**

A "tune-up" of the use of technology in education will benefit from examining and addressing the issues of program completeness, management and supervision, training and support, and dynamic awareness. There are three strategies that help in this on-going commitment.

First, continue to bring more technology into the schools. Making the use of technology improve instruction will encourage a larger commitment of resources, personnel, and money. The ratio of students to computers must be reduced to assure that utilization is effective. As the business community now enters a new generation of OS/2, Macintosh, 286, and 386 machines; hand-me-downs to the schools can improve the industry-education partnership proposed by educational leaders and can serve basic needs of the masses, such as for word processing.

Second, personnel directly responsible for managing and extending the use of technology utilization must be in place and positioned in such a manner within the organization to be effective. To complement a director of curriculum, there should be a director of educational technology that can supervise the integration of technology in an effective and efficient manner. The position needs to be high enough in the organization to provide enough clout to make things happen. It must transcend the parochial interests of a department. It is also necessary since technology doesn't fit the traditional educational structure; it is part of the curriculum, a strategy for instruction, and a tool to process the exploding amount of information. Depending upon the size of the district, technology leadershio can be an entity, or department; that is both instructional and supportive. Personnel needs to be available to service even the small needs that put up barriers and hinder success.

Third, develop the media centers to provide the foundation and continuity in mastering the processing of information. That alone will not create a comprehensive program, but without it a program will not be complete.

These strategies do not form a final commitment, but hail what we must do now to get the use of technology in education performing well enough to stay in the fast lane of our society's need for information processing skills.

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